

## THE DEEPSEA FISH GENUS *ENCHELybrotula* (OPHIDIIDAE): DESCRIPTION OF NEW SPECIES, NOTES ON DISTRIBUTION, AND OSTEOLOGY

Daniel M. Cohen

### ABSTRACT

The deepwater ophidiid fish genus *Enchelybrotula* Smith and Radcliffe, 1913 has been known from only two specimens, one the holotype of *E. paucidens* from the Celebes, the other listed as the host of a trematode from the Gulf of Panama. A report is presented on six specimens including the above two. A partial osteological description is given of a specimen from the Gulf of Panama. The genus is characterized in part by its narrow row of rather compressed jaw teeth, its massive lower jaw, and its highly placed pectoral fins, all of which may be part of a distinctive feeding complex. Four specimens from the Gulf of Panama are described as a new species, *E. gomoni*, based on a higher number of dorsal fin rays and vertebrae, and head length greater than body depth. The known range of *E. paucidens* is extended by a single specimen to the Bay of Bengal.

*Enchelybrotula* Smith and Radcliffe (Radcliffe, 1913) is a genus of rarely captured, deepsea, probably benthopelagic fishes classified by Cohen and Nielsen (1978) as members of the family Ophidiidae, subfamily Neobythitinae. Until recently the genus was based on a single specimen, the holotype of *E. paucidens*, taken in the Celebes. The known range of the genus was extended to the Gulf of Panama by Overstreet and Pritchard (1977), who reported a fish identified as *Enchelybrotula* (?) *paucidens* as the host of a previously undescribed genus and species of trematode. In addition to the two specimens mentioned above, I have been able to study four others.

The objectives of this paper are to provide information on the anatomy of *Enchelybrotula*, to describe four specimens taken from two localities in the Gulf of Panama as a new species, and to extend the known range of *E. paucidens* from the Celebes to the Bay of Bengal.

### OSTEOLOGY

This incomplete account is based on a single, cleared and stained specimen of *E. gomoni* (USNM 221142), which had been partly dissected when I received it. Most head bones are thin and poorly ossified, and many sutures are difficult to see. Also, during the clearing procedure the body flesh remained rather opaque, and some bones were lost. Terminology follows Cohen (1974).

#### Cranium (Figures 1 and 2)

In dorsal and ventral aspect the orbit and snout regions of the cranium are notably constricted, although this area in an entire head is rather broad. (A similar condition has been illustrated for *Benthocometes*, another broad-snouted neobythitine genus, Bougis and Ruivo, 1954.) The postorbital part of the cranium is roughly rectangular, with length about 1.5 times the greatest width. In lateral view the skull is deepest posteriorly and tapers evenly to the snout, with the dorsal outline interrupted over the orbital region by thin crests and troughs, and anterior to them a sharp projection on the dermethmoid.

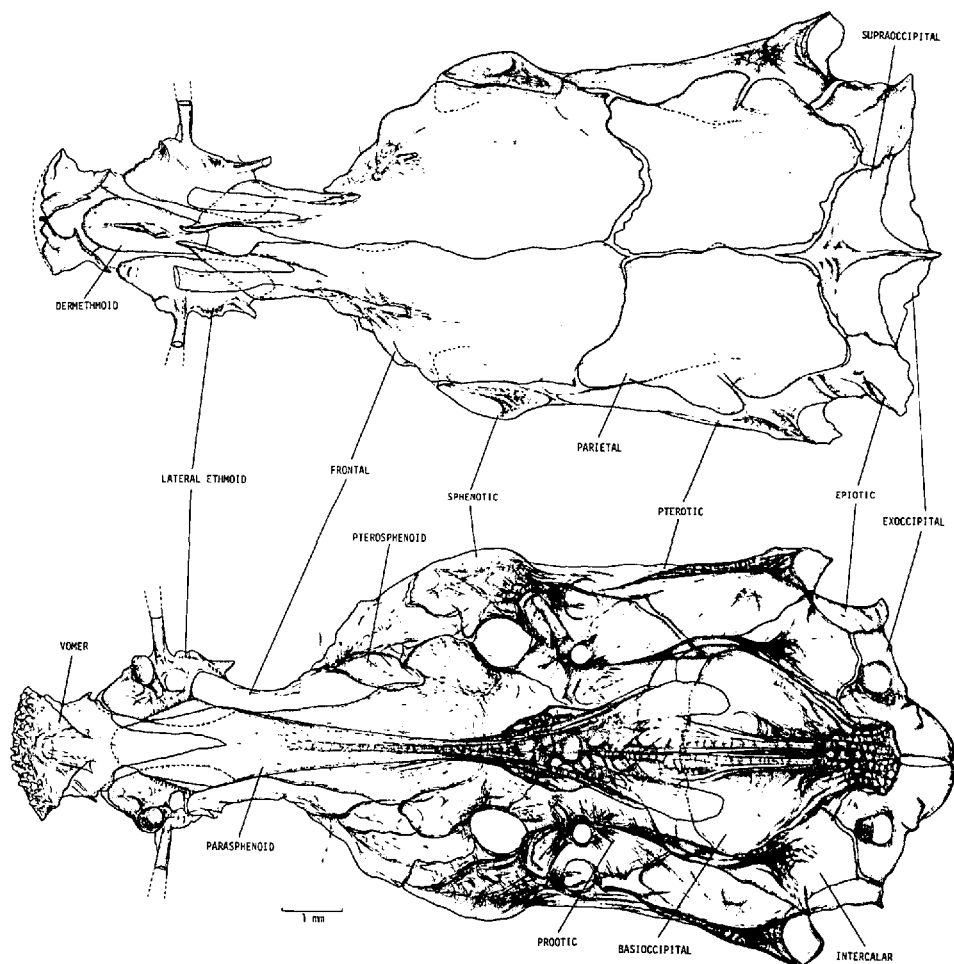


Figure 1. *Enchelybrotula gomonii*; USNM 221142, paratype. Dorsal and ventral views of cranium.

**Ethmoid Region.**—The median rostral cartilage is almost completely enclosed in bone. It is capped by a nearly oval dermethmoid, which carries a broad-based, compressed, dorsally directed spine in the midline; the dermethmoid is overlapped posteriorly by the frontals. Lateral ethmoids lie posterior to the posterolateral margins of the vomer, lateral to the dermethmoid and the anterior part of the frontals which overlap them, and on the ventral surface lateral to the parasphenoid which overlies their posteromedial margins. Each lateral ethmoid bears a short, ventrally-directed and a long, laterally-directed articulating head; the short one is tipped with cartilage; the long one attaches to a ligament.

**Vomer.**—A single median bone which in lateral view has a blunt tip and a posterior extension that reaches beyond the anterior margin of the lateral ethmoid. Viewed ventrally it has a broad head bearing an irregular row of teeth on the anterior margin and a slender tapering shaft appressed to the ventral surface of the parasphenoid.

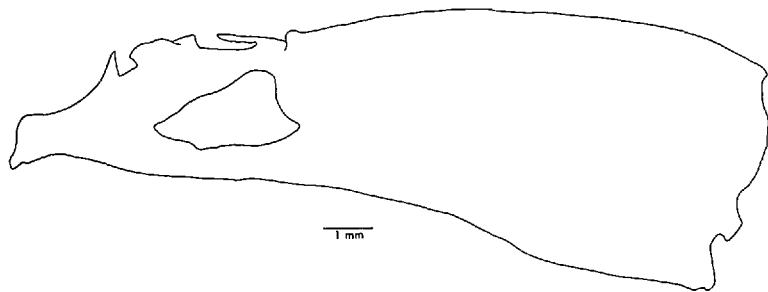


Figure 2. *Enchelybrotula gomoni*; USNM 221142, paratype. Lateral outline of cranium.

**Frontals.**—The paired frontals at their anterior ends overlap the lateral ethmoids and are developed dorsally into a pair of thin-walled troughs that reach nearly to the ascending dermethmoid spine. Viewed dorsally the frontals are notably constricted in the interorbital region and do not form an expanded supraorbital shield. In the postorbital region they broaden into thin plates, the rear margins of which overlap the parietals and which are bordered laterally by the sphenotics and far posteriorly by the pterotics.

**Parietals.**—The paired parietals are a continuation of the plate-like posterior section of the frontals. They are bordered laterally by the pterotics and posteriorly by the epiotics and supraoccipital which separates them in the midline for about their posterior one-fourth.

**Supraoccipital.**—A single median bone with lateral wings and a low crest that does not extend above the dorsal outline of the cranium.

**Exoccipitals.**—Paired bones that are nearly in contact at the midline dorsal to the foramen magnum. The main body of each forms the lower part of the concave fossa that serves as a strong area of attachment for epaxial body muscles. Each exoccipital is bounded dorso-medially by the supraoccipital; in ventral aspect anteriorly by the intercalar and by the epiotic, which separates the exoccipital from the pterotic; ventrally it lies on a wing of the basioccipital.

**Epiotics.**—A pair of thin, concave bones bordered by the exoccipital, the pterotic, and the intercalar, ventrally they form part of the posterolateral corner of the cranium.

**Intercalars.**—A pair of plate-like bones with a central foramen; they are located on the side of the otic capsule lying posterior to the prootic, dorso-lateral to the basioccipital and overlying that bone's margin, and ventral to the epiotic and pterotic.

**Basioccipital.**—A median bone which forms the posteroventral part of the cranium. It is bordered laterally by the exoccipital and the intercalar, both of which marginally overlay it, and is overlain ventrally by the posterior section of the parasphenoid. A broad unossified interspace on the face of the otic capsule separates the basioccipital from the prootic.

**Pterotics.**—Each of the pair is an elongate bone that posteriorly forms a prominent projection at the posterolateral corner of the cranium. The pterotic is posterior to the sphenotic, lateral to the parietal and frontal, and anterior to the

epiotic. At its anterior end, a lateral trough formed by the overarching of the dorsal surface supports the posterior arm of the hyomandibular.

*Sphenotics*.—Small paired bones, bordered posteriorly by the pterotic, medially by the frontal; ventrally the sphenotic contacts the parasphenoid and anteriorly the pterosphenoid. A deep concavity on the ventral face receives the articular facet of the anterior arm of the hyomandibular.

*Prootics*.—These paired bones form the antero-lateral segment of the otic capsule. There is a prominent foramen in the center of the bone, anterodorsolateral to which a well developed head articulates with the pterotic. The prootic also meets the intercalar and parasphenoid.

*Pterosphenoids*.—Paired bones, each a broad strut running from about the mid-length of the parasphenoid to the frontal and sphenotic.

*Parasphenoid*.—A long median bone which anteriorly lies dorsal to the shaft of the vomer and ventral to the postero-ventral margins of the lateral ethmoids. At midlength it supports the pterosphenoids. Posteriorly it forms part of the base of the otic capsule bordering on the prootic and projects ventral to the basioccipital with a pair of rounded lobes and medial to them a pair of finger-like extensions.

### Mandibular Arch (Figure 3)

The lower jaw is particularly massive, nearly in the shape of an equilateral triangle.

*Premaxillary*.—Extends nearly to the end of the maxillary and bears a single row of small, compressed teeth. A long anterior ascending process is tightly connected to its mate. It is followed by a second, broader, shorter ascending process, which is connected to the head of the maxillary.

*Maxillary*.—The head is an irregular, cup-like, flattened area which partly encompasses the second ascending process of the premaxillary and lies medial to an overlapping pronglike process from the palatine, to which it is attached. The rear margin of the maxillary is incompletely ossified.

*Supramaxillary*.—Even when stained this tiny splint of bone is scarcely visible over the rear part of the maxillary.

*Dentary*.—A complex, broadly V-shaped bone; the apical area is double walled and forms a pocket into which an anterior projection of the articular fits, as does Meckel's cartilage. The dorsal margin is thickened and bears a single row of small compressed teeth. The ventral arm is a flat shelf.

*Articular*.—An anteriorly-directed segment of the bone occupies most of the area between the two arms of the dentary. The posterior part is broad and strongly developed. The retroarticular process is a strongly reinforced saddle that receives the articulating head of the quadrate. A process extending anteriorly from the retroarticular process gives rise to Meckel's cartilage.

*Angular*.—A small, anteriorly-hooked bone located at the lower angle of the mandible and tightly attached to the articular.

*Coronomeckelian*.—A small, oval ossification on the surface of Meckel's cartilage near its origin from the articular.

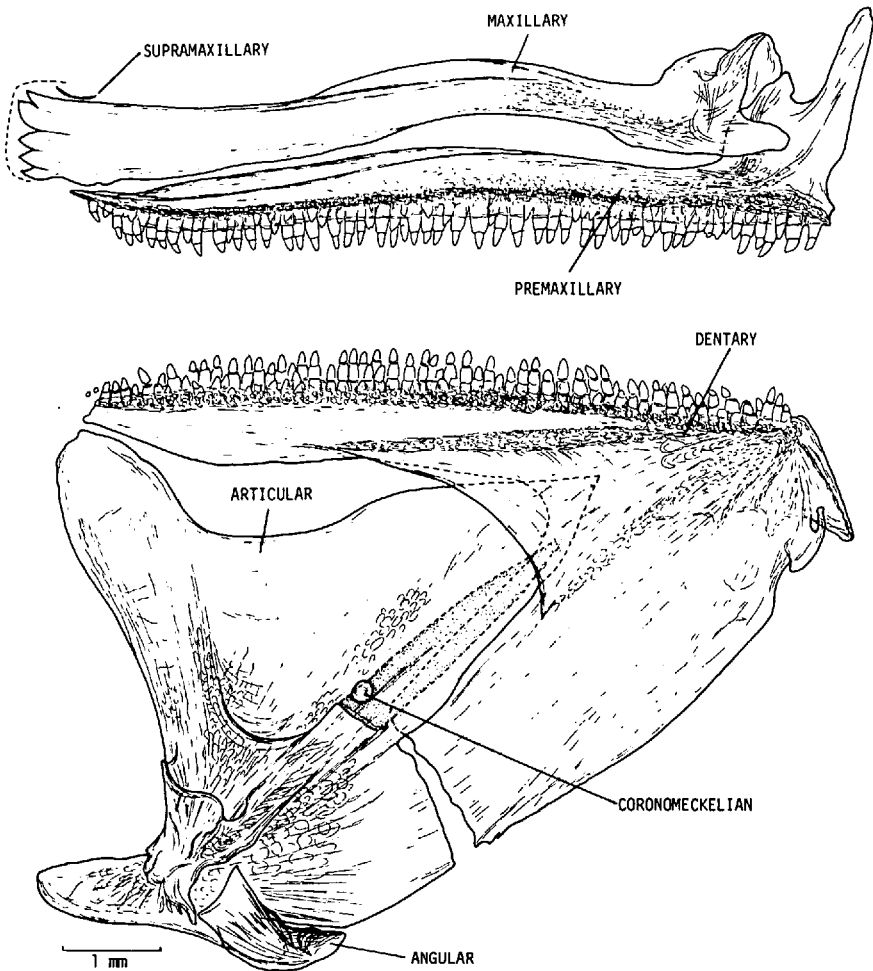


Figure 3. *Enchelybrotula gomoni*; USNM 221142, paratype. Medial view of left upper and lower jaws.

#### Palatine Arch (Figure 4)

*Metapterygoid*.—A triangular bone, the dorsal apex of which lies medial to the hyomandibular immediately anterior to the ventral articulating head of that bone. Posteriorly the metapterygoid is overlapped laterally by a shelf-like forward margin of the symplectic. Ventrally it borders on the quadrate and anteriorly overlaps the dorsal arm of the mesopterygoid, which does not reach the hyomandibular.

*Mesopterygoid-ectopterygoid*.—These two bones are tightly connected, and I cannot find a suture. Together they form a Y-shaped complex. The anterior arm lies dorso-medial to the palatine and abuts on a broad, posterior-facing palatine process. The dorsal arm lies medial to the lower leading edge of the metapterygoid, and the ventral arm lies median and anterior to the leading edge of the quadrate.

*Palatine*.—A complex bone with an anterior dorsal prong that hooks over the

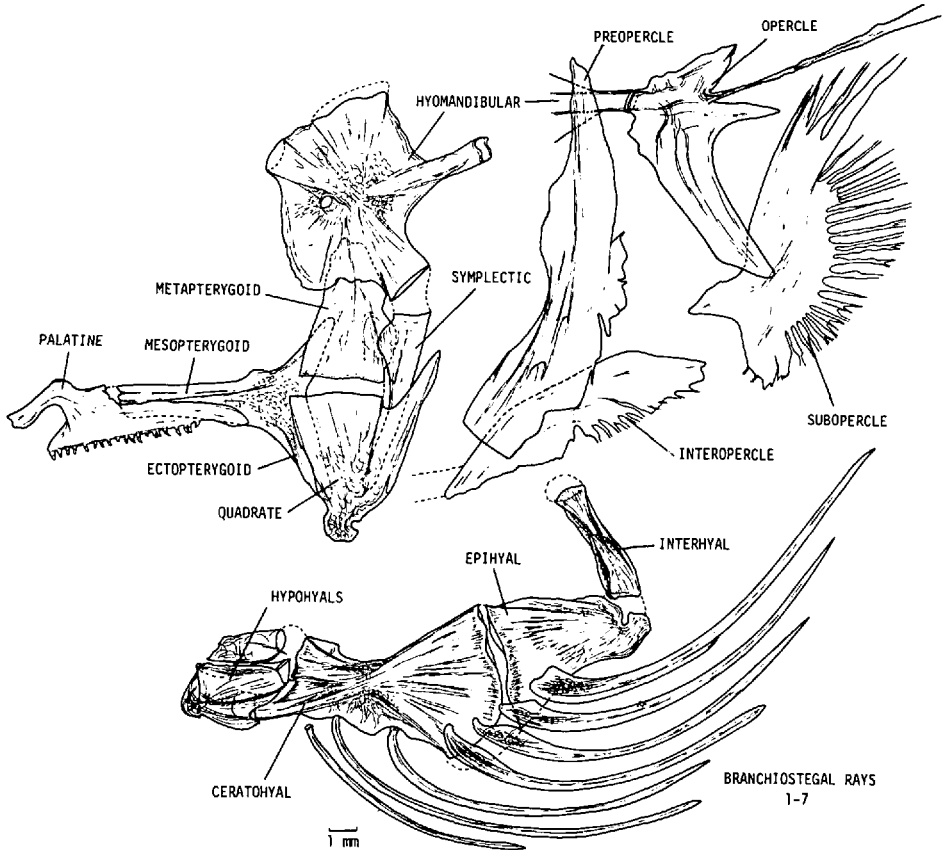


Figure 4. *Enchelybrotula gomoni*; USNM 221142, paratype. Lateral view of left palatine arch, hyoid arch and opercular apparatus.

head of the maxillary, a strong articulating area that meets the anterior extension of the ectopterygoid, and a broad, ventral tooth-bearing area that carries a single row of small, compressed teeth.

#### Hyoid Arch (Figure 4)

**Hyomandibular.**—A flat bone with four thickened areas radiating out from the center, each ending in an articulating head. Starting anterodorsally and proceeding clockwise, the first head articulates with the sphenotic; the next and largest with the pterotic; a slender, posteriorly-directed head connects with the opercle; a ventral one connects with the symplectic and interhyal. The medial face of the hyomandibular has a broad area of articulation with the metapterygoid.

**Symplectic.**—An elongate bone, extending from the hyomandibular and ventrally extending along the medial surface of the quadrate, to which it is attached, nearly to the ventral apex of that bone.

**Quadrate.**—A flat bone, the main body of which is triangular, lying ventral to the metapterygoid, with its anterior margin lateral to the ventral arm of the ectopterygoid. The lower angle of the quadrate is a thickened head that rests in a notch on the medial side of the articular. The posterior segment of the bone

extends dorsally as a prominent spine, well beyond the cartilage interface between the metapterygoid and the main body of the quadrate.

*Interhyal*.—A flattened rod that connects the ventral articulating process of the hyomandibular with a concave articulating surface of the epihyal.

*Epihyal*.—A nearly triangular plate with a slightly curved, peg-like posterior process.

*Ceratohyal*.—An elongate bone with a slender, anterior projection that lies partly ventromedial to the ventral hypohyal, and a broad, expanded fanlike area posteriorly, which articulates with the epihyal.

*Hypohyals*.—A pair, dorsal and ventral, are present on each side. The dorsal rests on the ventral one and is connected to an expanded, articulating surface on the dorsal part of the anterior margin of the ceratohyal.

*Branchiostegal Rays*.—There are seven on each side. The heads of the first three are ventral or slightly medial to the anterior shaft of the ceratohyal; two attach on the posterolateral part of the ceratohyal; one overlies the cartilage interface between the epihyal and ceratohyal, and the last overlies the epihyal.

*Urohyal and Basihyal*.—Missing from this specimen.

#### Opercular Apparatus (Figure 4)

*Preopercle*.—The largest and strongest bone in the opercular series, it consists of a strong lateral ridge nearly completely surrounded by a thin shelf. The dorsal arm crosses the hyomandibular laterally, to which it is loosely attached. An inflection in the alignment of the bone occurs lateral to the interhyal, to which the preopercle is strongly connected. It is attached anteroventrally to the quadrate and at its anteroventral tip to a posterior projection of the articular.

*Interopercle*.—A rather long bone, which anterodorsally lies medial to the ventral segment of the preopercle. A strong ligament attaches the anterior angle of the interopercle to the angular.

*Opercle*.—A slight, three-armed bone, of which the ventral arm is the longest. The middle arm is the strongest and constitutes the opercular spine; it is in line with the hyomandibular facet on the anterior margin of the opercle. An excessively thin and fragile ossified filament (double on one side) extends posteriorly between the upper and the middle arms and extends above the dorsal margin of the subopercle.

*Subopercle*.—This thin bone which is incompletely ossified forms nearly the entire rear margin of the opercular flap. Stained areas radiate posteriorly as elongate fingers and filaments.

#### Superficial Dermal Bones

There are four pairs of circumorbital bones. The first is the largest and extends from the level of the anterior nostril to the midlevel of the orbit, although the posterior section is unossified. It has an incomplete dorsal roof and a ventral shelf area, the margins of which are ossified only in radiating fingers and filaments of thin bone. The ossified portion of number two is at the posteroventral segment of the orbit and consists only of a small nucleus and a few bony strands; however, the membranous part of the bone is extensive and has a curved roof and a large

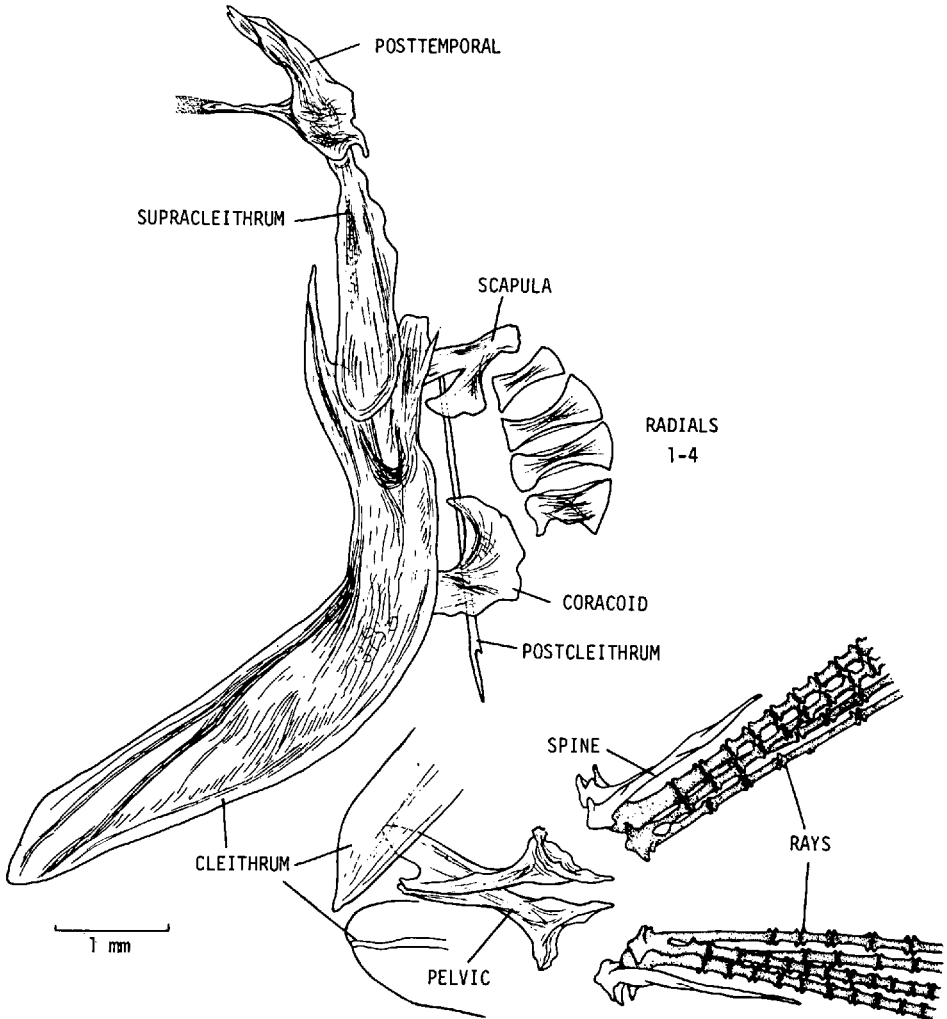


Figure 5. *Enchelybrotula gomoni*; USNM 221142, paratype. Lateral view of left pectoral girdle; ventro-lateral view of left pelvic girdle and rays.

distal shelf area. Three and four are tiny irregular-shaped ossifications, one posterior to the middle of the orbit, the other at the posterodorsal corner.

The nasal is represented by a slight, rayed ossification buried in the fleshy snout lateral to the ascending process of the premaxillary.

#### Pectoral Girdle (Figure 5)

*Posttemporal*.—The main body of the bone is elongate and scale-like. A slender ossified rod extends anteromedially from the ventromedial segment of the bone and gives rise to a ligament that connects with the intercalar.

*Supracleithrum*.—This is a slender, simple bone with a sinuous upper rear margin. The bone is overlain dorsally by the posttemporal and itself overlays the cleithrum ventrally.



*Cleithrum*.—The leading margin is rounded and thicker than the scale-thin blade of the bone. The anterior ends of both cleithra are bound together by tough fascia and support the pelvic girdle between them.

*Scapula*.—A broadly Y-shaped, scale-thin bone with the tip of its anterodorsal arm lying medial to the cleithrum. The posterior arm supports several pectoral fin rays.

*Coracoid*.—The bone is widely separated from the scapula, irregular in shape, and is thin but strengthened with several ridges. There is a small foramen near the center. The anteroventral part of the bone lies medial to the cleithrum.

*Pectoral Radials and Fin Rays*.—There are four, hourglass-shaped radials, which together with the scapula support the filamentous fin rays. Each ray, on its medial face and slightly distal to its base, carries a thin, ossified shelf strengthened with one to four ridges. Some of the shelves extend dorsally over two fin ray bases and end in a fimbriate margin.

*Postcleithrum*.—An elongate splint lying median to the scapula and coracoid.

#### Pelvic Girdle and Fins (Figure 5)

The paired pelvic bones are aligned vertically between the tips of the two cleithra. Beneath the cleithra they diverge and expand into broad processes, each of which supports a slender spine and two long, filamentous, segmented rays, each bilaterally divided to its base.

#### Axial Skeleton and Median Fins

The neural spine on the first centrum is shorter than those following; the two halves are not joined in the midline. The first centrum lacks ribs; one pair is present on the second and two pairs on the third. Subsequent centra have well developed parapophyses, each of which supports two ribs over most of the abdominal section of the vertebral column; however, at the rear of this section ribs are progressively smaller, and at the end of the abdominal section of the column there are none.

The median fin rays are delicate and filamentous. There is no free predorsal bone. The caudal fin consists of eight rays supported by a single hypural.

#### SYSTEMATICS

A diagnosis for *Enchelybrotula* has been presented by Cohen and Nielsen (1978) as well as comments on possible relationships. More may now be said about several characteristic features of these fishes, which may be part of a distinctive feeding complex. The massive lower jaw (Fig. 3) and the dentition of cutting teeth suggest that *Enchelybrotula* must cut off small pieces of food rather than ingesting whole animals or tearing away large chunks of flesh as do their apparent relatives<sup>1</sup> which bear variously developed bands, rows, and pads of granular teeth. Perhaps *Enchelybrotula* nips at coelenterate tentacles or at other fishes. Unfortunately, the several stomachs examined were empty. The high placement on the body of the pectoral fins and their slightly oblique orientation

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<sup>1</sup> Motion pictures taken in the deep sea by the Scripps Institution of Oceanography show individuals of *Spectrunculus* tearing flesh from carcasses.

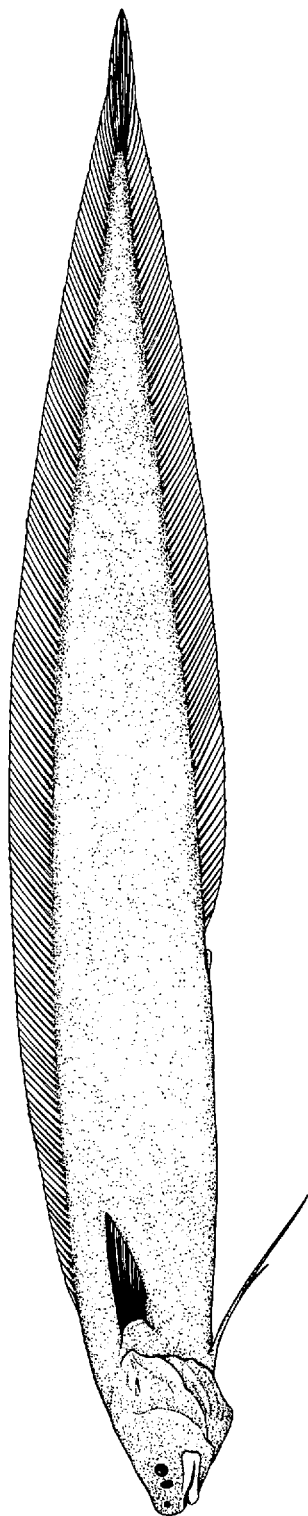


Figure 6. *Enchelybrotula gomoni*; USNM 221141, holotype, 312 mm SL. Drawn by Keiko Hiratsuka Moore.

Table 1. Summary of differences between two species of *Enchelybrotula*

Character	<i>E. paucidens</i>	<i>E. gomoni</i>
Dorsal fin rays	130	135-136
Vertebrae	72	73-75
Body depth	Greater than head length	Less than head length

must be related to the attitude of the fish in the water and also may be part of the feeding complex.

The four examples of *Enchelybrotula* from the Gulf of Panama are considered to represent a species distinct from the Celebes and Bay of Bengal fishes; differences between the species are summarized in Table 1. Although these differences are not of great magnitude, I believe they are significant because of the apparent habitat of *Enchelybrotula*, deep water along the continental rise but in close proximity to land. All localities at which *Enchelybrotula* has been caught are nearer to shore than about 130 km. If this habitat preference is real, then eastern and western Pacific populations of *Enchelybrotula* must be separate from each other.

***Enchelybrotula gomoni* new species**  
(Figure 6)

*Enchelybrotula* (?) *paucidens*, Overstreet and Pritchard, 1977, p. 842, *non* Smith and Radcliffe, 1913.

**Study Material.**—Holotype, USNM 221141, GILLIS station 4, 14 Jan. 1972, 6°42'N, 78°56'W to 6°44'N, 78°54.5'W, 3,173 to 3,208 m, 41 ft. otter trawl. Paratypes: USNM 221142 (1), stained and cleared, data as for holotype; UMML 22859 (1), PILLSBURY station 526, 5 May 1967, 6°53'N, 79°27'W to 6°49'N, 79°29'W, 3,195 to 3,202 m. ZMUC P77700 (1), data as for the preceding. Both localities in the Gulf of Panama.

**Diagnosis.**—See Table 1.

**Description.**—Counts and measurements are presented in Table 2.

Body elongate and strongly compressed, depth at vent 9.2 to 10.8 in standard length; tail not attenuate and whiplike. Belly notably elongate, head length 2.9 to 3.7 in preanal distance. Dorsal fin origin posterior to rear margin of head, head length 1.2 to 1.3 times in predorsal length. Pectoral fin shorter than head and immediately posterior to it, placed rather high on the body, closer to dorsum than to belly; its base at an oblique angle, dorsally tilted slightly forward to vertical; asymmetrical, the rays of the dorsal half of the fin longer than those of the ventral half. Ventral fins immediately adjacent to each other at their bases, about an eye diameter posterior to the symphysis of the cleithra; each fin with two rays that are joined together and rather thick proximally, the inner ray longer than the outer.

The entire fish is a pale straw color with no markings and having transparent to translucent skin. The scales are deciduous, thin, and small, with at least 200 vertical rows along the side of the body. Scales cover the entire body and head including the dorsal and anal fins and branchiostegal membranes.

Head short, 7.7 to 9.0 in standard length. Lower jaw included; snout slightly depressed and inflated. The small eye is visible through an elliptical, vertically elongate, clear window, which goes 8.2 to 11.3 times in head. Anterior nostril a simple circle slightly closer to tip of snout than to eye. Posterior nostril a prom-

Table 2. Selected counts and measurements for two species of *Enchelybrotula*

Character	<i>E. gomoni</i>								<i>E. paucidens</i>			
	Holotype		Paratypes						Holotype			
	USNM 221141		USNM 221142*		UMML 22859		ZMUC P77700		USNM 74138		ZMUC P77699	
	mm	%SL	mm	%SL	mm	%SL	mm	%SL	mm	%SL	mm	%SL
Standard length	312	—	300	—	267	—	243	—	491	—	325	—
Preanal length	127	40.7	121	40.3	100	37.4	88.4	36.4	195	39.7	132	40.6
Predorsal length	46.5	14.9	41.4	13.8	41.3	15.5	34.1	14.0	79.6	16.2	50.8	15.6
Preventral length	34.5	11.1	—	—	23.7	8.9	23.4	9.6	45.2	9.2	32.7	10.1
Body depth	34.0	10.3	28.4	9.5	28.3	10.6	22.5	9.3	65.7	13.4	40.6	12.5
Pectoral fin length	28.5	9.1	26.2	8.7	23.3	8.7	16.6	6.8	37.5	7.6	26.0	8.0
Ventral fin length	41.9	13.4	35.0	11.7	34.8	13.0	21.0	8.6	60.3	12.3	44.0	13.5
Head length	37.4	12.0	32.7	10.9	34.9	13.1	27.1	11.1	63.1	12.8	38.7	11.9
Upper jaw length	15.0	4.8	14.1	4.7	13.3	5.0	11.9	4.9	26.5	5.4	15.3	4.7
Snout length	10.0	3.2	8.6	2.9	9.3	3.5	7.2	3.0	16.1	3.3	10.0	3.1
Eye diameter	4.1	1.3	3.1	1.0	3.1	1.2	3.3	1.4	6.0	1.2	4.4	1.3
Dorsal fin rays	136		135		135		135		130		130	
Anal fin rays	93		96		94		96		93		91	
Pectoral fin rays	23		23		22		22		22		22	
Ventral fin rays	2		2		2		2		2		2	
Caudal fin rays	8		8		8		8		8		8	
Vertebrae												
Branchiostegal rays	23 + 52 = 75	23 + 50 = 73	23 + 51 = 74	22 + 52 = 74	22 + 50 = 72	22 + 50 = 72	22 + 50 = 72	22 + 50 = 72	22 + 50 = 72	22 + 50 = 72	22 + 50 = 72	22 + 50 = 72
	7		7		7		7		7		7	

\* Now cleared, stained, and dissected.

inent vertically elongate slit immediately anterior to the eye, its height about equal to the horizontal diameter of the eye window. The maxillary extends slightly beyond the rear margin of the eye window; not greatly expanded posteriorly, its vertical dimension being about equal to the horizontal diameter of the eye. A short, sharp spine is buried beneath the skin of the opercle, its point falling far short of the rear margin of the head and reaching to only about midlength on the opercle.

The gill rakers on the first arch are short spiny pads or tubercles, three to five on the upper arm and six to 10 on the lower; the one or two nearest the angle of the arch in the two largest specimens might be considered as "developed" as described by Cohen and Nielsen (1978). Gill filaments are short. A pseudobranch consisting of a single filament is present in the two smaller specimens.

Head pores are as follows: supraorbital, a single pore on the upper lip antero-medial to the anterior nostril; infraorbital seven, distributed beneath the anterior nostril, along the upper lip, and behind the eye; preoperculo-mandibular nine, of which six are on the mandible; lateral two, one near the upper angle of the gill slit, the second at the top of the preopercular canal; supratemporal none.

The liver is small, the longest lobe reaching barely beyond the rear of the pylorus. A prominent, elongate, muscular, caecal section of the stomach, which exits to the pylorus near its anterior end, extends about three-quarters of the distance along the body cavity. The swimbladder is a thin-walled oblate sphere (approximately 2.5 mm long in USNM 221141). The gonads in ZMUC P77700 are a pair of short, bean-shaped immature ovaries that are closely joined anterodorsally and located near the rear of the body cavity. The peritoneum is lightly pigmented with a sparse distribution of dark chromatophores. The orobranchial cavity is pale.

*Name*.—Named for Dr. Martin Gomon who first identified the types as specimens of *Enchelybrotula* and called my attention to them.

*Enchelybrotula paucidens* Smith and Radcliffe

*Study Material*.—USNM 74138, holotype, ALBATROSS station 5608, 00°08'S, 121°19'E, Gulf of Tomini, Celebes, 1,993 m. ZMUC P77699 (1), GALATHEA station 299, 17°10'N, 84°30'E, Bay of Bengal, 2,820 m.

Measurements and counts for the two known specimens are presented in Table 2 and are in reasonably close agreement. The two specimens are however different in two notable respects, one being the numbers of head pores along the lateral and supratemporal canals. The holotype of *E. paucidens* has a row of three pores in the lateral canal and a single supratemporal pore on each side; the Bay of Bengal specimen has two pores in the lateral canal and none in the supratemporal canal, in which respect it resembles the four known specimens of *E. gomoni* described above. A second difference between the two is in pigmentation. Smith and Radcliffe (Radcliffe, 1913) described the color of the holotype in alcohol as, "Olivaceous; margin of opercle, lips, and fins slightly darker; the posterior rays of dorsal and anal and the caudal clove brown; peritoneum cinnamon, punctulate with darker." Although the holotype has faded, the color pattern remains essentially as described. The Bay of Bengal specimen, on the other hand, is uniformly pale with transparent skin through which the body musculature can be seen; it resembles the four examples of *E. gomoni*. Perhaps the pigmentation of the holotype of *E. paucidens* is a consequence of its much larger size (see Table 2).

ACKNOWLEDGMENTS

In addition to M. Gomon I thank the following for the loan or gift of specimens or for helping me in other ways: J. G. Nielsen, R. Overstreet, C. R. Robins, J. Staiger. Illustrations of osteology were finished by K. H. Moore from camera lucida drawings by the author. The manuscript was read by B. B. Collette, J. G. Nielsen, and R. Vari, all of whom made valuable suggestions.

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DATE ACCEPTED: April 23, 1980.

ADDRESS: Systematics Laboratory, National Marine Fisheries Service—NOAA, National Museum of Natural History, Washington, D.C. 20560. PRESENT ADDRESS: Northwest Alaska Fisheries Center, NMFS-NOAA, 2725 Montlake Blvd. E., Seattle, Washington 98112.